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ABSTRACT

Technology education as a key learning area can be viewed as the designing, making, and appraising of systems, materials, and information. This study examined young Australian children's technological experiences prior to beginning school in order to build on their learning base in curriculum planning. The purposes of the research were to: (1) investigate the range of home experiences young children have in planning, making, and appraising activities and products; (2) study whether and which home experiences influence children's approaches and abilities to plan technological activities; and (3) suggest ways of building on children's natural planning techniques to enhance, develop, and widen their planning strategies. Data were collected through interviews with 12 children (mean age of 4 years, 3 months) attending a preschool and child care center. Results indicated that children were able to outline how they spent their days and how decisions were made regarding the day's events. They showed varying levels of understanding regarding planning. Children participated in a range of home activities where tney made things, mostly with materials rather than with information or systems, and usually focusing on people and home maintenance. Information technologies were most often associated with passive viewing or receiving; for example, children listened to tapes and did not construct their own audio tapes. Most planning activities occurred orally, with some two-dimensional activities such as writing a shopping list. Children did not understand the concept of appraisal so this area could not be assessed. (Contains 13 references.) (KDFB)

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INVESTIGATING YOUNG CHILDREN'S HOME TECHNOLOGICAL LANGUAGE AND EXPERIENCE

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ED 406 034

ABSTRACT

Technology education as a key learning area is viewed as the designing, making and appraising of systems, materials and information. As a field of study, it is relatively new. This paper reports on the findings of a study which sought to identify young children's technological experiences prior to the commencement of school, with a view to building on this base in curriculum planning.

INTRODUCTION

The introduction of National Curriculum documents within Australia and England and Wales demonstrates how technology education has in recent years become a key learning area. Until recently, technology education was either not known or taught in secondary schools under a range of different names, with corresponding emphases. As a result, adults in the community (Hardy, 1992), children (Rennie & Jarvis, in press) and teachers (Rennie, 1987) have tended to have different perceptions of technology education from those focused on by curricula developers in both Australia and the United Kingdom.

Technology education as depicted in national documents in both Australia and the UK incorporates a design, make and appraise (DMA) approach within the context of systems, materials and information. This approach to technology education emphasises the human enterprise associated with, and needed for, creating products and processes in our everyday life. Yet, as a field of study it is relatively new and, as a result, very little is understood about how to teach this area.

Similarly, very little is known about what young children can do in this area before they commence school. What prior experiences are needed for children to work technologically in school? What assumptions are implicit within the technology curriculum regarding the skills and knowledge children need? Is there a belief that no prior knowledge is required? More needs to be understood about children's home experiences in technological activity if teachers are to implement appropriate and meaningful technological experiences for all children. In this paper, the findings of an exploratory study which sought to identify the range of technological experiences children have at home are presented. Whilst it is acknowledged that each home context will be unique, the findings of this study do provide an indicator of likely technological experiences some young children have before they commence school.

TECHNOLOGY EDUCATION - WHAT IS IT?

Over the last ten years, we have heard debates surrounding the definition of the term 'technology'. Mostly, technology is thought of as high or new technology such as a computer or recent invention (Hardy, 1992; Rennie & Jarvis, in press; Symington, 1987). Little thought is given to simple technologies such as the paper clip, traditional technologies such as a coolamon, support technologies such as the baby's bottle or technological processes such as cattle breeding.

David Symington (1987) demonstrated through a simple questionnaire administered to 70 experienced primary teachers that most teachers think of high technology when they consider this

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key learning area. For example, all respondents rated the test-tube baby, microwave and computer as items of technology, whilst few thought of an ice-cream stick, racehorse or bulldog as associated with technology. Similar associations have been reported elsewhere with teachers (Rennie, 1987) and even children (Rennie & Jarvis, in press). If technology is linked with new technologies, what does this mean for technology education?

Michael Scriven postured in 1985 that technology education is a separate enterprise from science education. However, this perspective has been hotly contested by many. Since then, we have seen many definitions of technology education emerge. Paul Gardner (1992) provides a comprehensive analysis of how technology education has come to be understood. According to Gardner (1992), technology education has been conceptualised as: technology-as-illustration, the cognitive-motivational approach, the artefact approach, and the process approach.

The technology-as-illustration approach considers technology as 'applied science'. The science content is taught through using a particular piece of technology, for example, the use of microscopes or hand lenses to investigate small animals such as slaters.

The cognitive-motivational approach also treats technology as applied science. Students are introduced to a piece of technology early in a lesson to provide motivation for science learning. For example, students may examine how a toaster works. The toaster provides the stimulus for investigating electricity.

The artefact approach treats technology as the vehicle for understanding how various parts of an artefact interact and what scientific principles are involved. For example, students may be asked to investigate a range of clocks through pulling them apart and determining how the spring operates, thus investigating energy.

The final approach outlined by Gardner (1992) is the process approach to technology. In this sense, technology is considered a process of inventing, designing, making and appraising. Scientific ideas are only considered as relevant when they contribute to this process.

Beverley Jane and Wendy Jobling (1994) have taken this work further and argued that a symbiotic relationship can exist between science education and technology education. They cite the example of how young children (6 and 7 year olds), when investigating small animals, can design, make and appraise a *bug catcher* and *home* for the animal to live in whilst it is being studied. The stimulus, (and hence purpose for the child) for the technological work in this example, is the science context. Although there is a clear relationship between science and technology being illustrated by Jane and Jobling (1994), technology is viewed as a process of designing, making and appraising with materials.

More recently, technology education has become considered as *a process, a way of thinking and doing by which students take responsibility for creating products which satisfy needs in society and the environment* (Gilbert, 1990:7). This perspective underpins the thrust of *Technology - a curriculum profile for Australian schools* (Curriculum Corporation, 1994), which leads the debate at the present time on the definition of technology education in Australia.

The discussions in the literature, by curriculum developers and by teachers, have centred around what is technology. However, little attention has been given to how best to facilitate technological capability in children. What do we know about children's cognitive preferences? How are these shaped in the early years by their home experiences? Do we take account of their intuitive playing in designing, making and appraising or do we simply impose experiences based on what we think is best for children's learning? What can we learn from children?

HOME-SCHOOL TECHNOLOGICAL ACTIVITY: DO THEY SUPPORT EACH OTHER?

As a result of curriculum development in both Australia and the UK, children as young as five are expected to be involved in technology education. Yet, we know very little is known about how young children should be involved in this systematically organised curriculum. Only a small amount is understood about the difficulties associated with introducing technology education to young children.

Research into this area has shown that children from Western cultures draw from a front view perspective when involved in technology education and not a plan view, as is needed if they are to successfully engage in the design element of the design, make and appraise approach detailed in the curriculum (Fleer, 1993). Moving their orientation in drawing is achievable but requires carefully constructed scaffolding on the part of the teacher (Fleer, 1993).

In addition, cross cultural work has indicated that Australian Aboriginal children from traditional communities have cultural experiences which make it very easy to draw from a plan view. For example, sand drawings and many figures within Aboriginal art work are depicted from a plan view rather than a front view perspective (Fleer, in press). Young Aboriginal children from traditionally oriented communities have many experiences with story-telling using plan view images in their sand drawings. However, little else is known about Aboriginal children's cultural experiences which are likely to facilitate engagement in technology education.

Clearly, then, children's home experiences are important in determining the challenges that will be faced by teachers and children as they attempt to implement the technology curriculum in their classrooms or preschool centres. Research is urgently needed into finding out what children know and can do in technology education before they begin preschool or childcare. We also need to examine how these experiences can be best built upon so that learning is meaningful and appropriate to the needs of young children.

THE STUDY

The research project aimed to:

- investigate the range of home experiences young children have in planning, making and appraising activities and products;
- investigate whether and/or which home experiences influence children's approaches and abilities to plan technological activities; and
- suggest ways of building on children's natural planning techniques to enhance, develop and widen their planning strategies.

The findings of part one are reported in this paper. Data were collected from children attending a preschool and child care centre. Children were interviewed whilst in their home environment. This was important in building an understanding of what technological activities children engaged in prior to or at the same time as attending preschool or childcare centre. In each case, the children's teacher acted as the researcher - interviewing children within the context of a home visit with the view to the child showing them around and talking to them about what they do at home. It was decided that this would be a far more effective method of stimulating children to talk about their home technological experiences as the motivation for the children to share with their teacher was high. This also enabled the teacher to gain greater insights into the children's technological capabilities, hence planning for their learning was likely to be better suited to the children's needs, interests and experiences. (See Appendix One for details of questions.)

All home interviews were audio-taped and transcribed. Each interview lasted approximately one hour (although the visit often was longer). Three children from the childcare centre did not respond verbally to being interviewed at home. As a result, the teacher interviewed these children at the childcare centre.

All data were analysed for what children do at home with regard to planning, making and appraising with materials.

Sample

A total of twelve children (six boys and six girls of average ability as described by their teachers) from a preschool or childcare centre in the ACT were involved in this study. The children's mean age at the time of the study was 4 years and 3 months. The youngest child was 3 years and 10 months and the oldest was 5 years and 3 months. All the children in the preschool and the childcare centre were involved in the teaching program. However, only six case studies from each centre were featured in the data collection.

Findings

If we examine the activities of an infant, toddler and preschooler in the home, we begin to see how the child's culture involves them in a multitude of planning opportunities. Whilst each child's family experience will vary, the range of possible technological activity could be quite vast. Rituals and routines, whilst not always articulated to the child, do form an important part of the child's ability to predict or plan what will happen. For example, children are involved in dressing, shopping, cleaning the house, washing, bath time, singing games, peek-a-boo, and bed time, to name but a few important processes for the child. Similarly, unusual events such as going on an excursion or to a party are usually preceded by oral planning. Preparation for a visitor, using a manual to set up a video, tune a car, set up a sewing machine, using a plan to assemble furniture, follow a street directory, using a TV guide, and using shopping centre guides are all technological activities that could take place in the home or surrounds.

We need to know more about the key rituals that children engage in which form an important part of their daily planning and which provide a foundation for effectively engaging in technology education at school/preschool. In Tables 1-3, data are summarised which show, from the child's perspective, what technological tasks they are involved in when in the home.

TABLE 1: HOME ROUTINES DESCRIBED BY CHILDREN

	Childcare children	Preschool children
Routines (general)	Puzzles and draw; look at picture books and go out and ride my bike, and go down to the horse paddock. (Claire) I sometimes get my back pack ready; before sleep time in the day I will probably watch Playschool then, go out in my garden and pick some lovely flowers. (Grace) I do drawing on my own. (Matthew) Play, a drawing. (Teddy) Watch the music box, watch Blinky Bill at dad's place. (Sarah)	I have my lunch then I go outside and play. I jump with Tamara and Danielle. (Regan) I have lunch then I play in my room. Then I play outside and chase butterflies and play with toys and make aeroplanes. (Jessica) I go into the pool. I have a sleep. I eat. (Erin) I play with teddies and play with all my toys. Lunch is after I play then I take Radar (the dog) down to the lake. (Elliot) I have lunch and then go outside and play. I play with Robert. (James) I take off my shoes to lie down on the couch. Then I have my lunch and then afternoon tea. Then I have a big drink of water and then have another rest. (Lauren)

Routines (morning)	Get dressed; and go in the car and drive; I do what my mummy and daddy says; I choose for playing. (Daniel) Put your clothes on very quickly then go to the daycare centre. (Anthony) My mum would decide what I'm going to wear and, I decide what I'm going to play with. (Claire) Mummy decides what I am going to wear. (Daniel) I don't know. (Anthony) I just think what I am going to wear. (Matthew) I think, those ones we choose these and they got Bubby and Bubby shoes and Bubby pants and um I have toys in my room and pokies. Mummy does (choose clothes). (Sarah)	I get some clothes on. I get dressed and put on my shoes and make by bed and get my bag and then I am ready to go to preschool. I look at the weather, it tells me if it is sunny or cold. If its sunny I wear shorts and tee shirts and if it is cold I wear a flannel shirt. (Regan) I have breakfast then I brush my teeth. I look in my cupboards and have a look at the clothes I want to wear. Now I look in my summer cupboard. (Jessica) I tell myself to get dressed. I wear what clothes my mum puts out for me. (Erin) I wear gloves, these are my motorbike gloves. Today I need a hat to keep the sun off my face. (Elliot) I always get up and play with my Lego first. I wear clothes. I just know what to wear, I know when it is hot. (James) I choose what clothes to wear and mummy puts them on. I look in my wardrobe and because it is cold I know ... mummy told me and I could see a grey sky. (Lauren)

Table 1 demonstrates a range of child-focussed activities. In many instances, the children have articulated these activities in the form of a progression. Most of the children have clearly expressed their ordered and planned world. With little prompting, the children have been able to outline how their day is spent, with some making comment on how decisions are made with regard to these events. The act of planning is expanded upon in Table 2, where the children from the childcare centre outline what they understand about the word plan. Unfortunately, the preschool children were not asked this question.

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TABLE 2: PLANNING ACTIVITIES (CHILDCARE CENTRE CHILDREN ONLY

Level 1	Confusion	Planting. You're doing something. (Anthony)
Level 2	Emerging ideas	Yeah. Planting. Got to think of something. Don't know what it means. (Teddy) Um, I, I can plan, I can plan my train tracks and my, I can plan, playing with the train track and play which train I like. Um, I've got a book of planning about a cat. (Daniel)
Level 3	Observational	That means, I know what it means. It means doing hard work, hard work. My dad is a worker. Sometimes he does a bit of planning. He probably, does a bit of planning of work. I think he just, the only, he talks to people on the phone and plans the ... people that help him. (Grace)
Level 4	Event focused	Planning to do some things. Going to someone's house. (Matthew)
Level 5	Construction oriented	When you plan something. You've got to, you can, you can plan something and then build it and, or what you what to do. (Alyse)

Five levels of thinking were evident in the responses given. Three children gave responses which demonstrated confusion (Anthony) or emerging understanding of the term (Teddy, Daniel). The term 'planning' was confused with 'planting'. However, two of the children were able to outline that it had something to do with *thinking*. Grace's understandings related to observing her father

actively plan on the telephone. Similarly, Matthew related the term to planning for visiting someone. Alyse had a much broader understanding. She considered planning within the building process.

When planning was contextualised within a special event such as planning for a holiday or dinner, the following responses were given by the children (Table 3).

TABLE 3: PLANNING FOR SPECIAL EVENTS

	Childcare	Preschool
Holidays	We need my nighties, or my pull-ups. If I've got enough. Some clothes. Some bedtime books. (Claire) We need bedspread, clothes and camera. (Daniel) I just um, think. Well some of my toys (That's all you will take?) Yeah because, they already have drinks at Grandma and Grandad's house. Or food, I don't need to take any food either. I just need to pack clothes and toys. (Matthew) Beach. Ball shovel and spades too. And a bucket. Food - meat you can eat, rolls everything. Pillow and combs, toothbrush and tooth paste. (Teddy) Need to take ... my water, it's all empty, have to get some milk instead, have to get some apple juice and um some biscuits and um bit of lunch and um toys and oh, and I need um my big toy, he's pink. Super Ted and we'd need oh little Ted and the Grandma Teddy Bear, and the Poppy one. He's pink. Need some pencils, paper and colouring books I think that's all now. (Prompt - clothes): Um barbie, barbie, barbie shoes, barbie pants and one singlet. (Sarah)	Mum decides. (Jessica) They ring up on the phone and we talk about how we are going to get there and see if we need a car. Then we ring up the person. We also need to think about clothes. (Erin) We go to the lake. We need to lock the house. We need to take food. (Elliot) My dad decides. We pack our bags and go. He first sees if we all want to go. We need to lock the house. (James) We usually plan by thinking, we think what place we are going to and then we catch a plane. (Lauren)

Cooking	Flour. Pancakes. Flour, sugar, butter, mix it up and cook it. (Claire) Well flour. Cornflour, eggs, butter margarine. We could make sprinkle cakes or you could make cream cakes ... (Matthew) Ingredients. Chicken, potatoes, corn and that's all. (Teddy) Hot chockies with Grandma. You put milk, you put the ? in the cup and you put, and there's chocolate in the top. (Sarah)	Mummy decides and tells me that I will have chicken. (Jessica) Us .. we say what we want for tea. We have a meeting and discuss - only us (Tim and Erin) and then we tell mum we want spaghetti. (Erin) Pizza - Geoffrey and I like pizza, mum knows that. (Elliot) We have what we feel like. I just ask mum to have what I want. (James) They choose it in their head and then they get an idea and then they use a cookbook to get the recipe. (Lauren)

Planning for these children is clearly something that is quite familiar to them. Their responses indicate portions of processes that they are likely to undertake. For example, Teddy speaks in categories - toys, food and then toiletries. Erin details how the planning process operates - phoning, travel requirements and then packing. In the cooking example (Table 3), all the childcare children detail the types of ingredients they are familiar with, each labelling what they are cooking. The preschool children discuss how they plan what they are going to eat. Although the focus for the childcare and the preschool children was different, their responses indicate an awareness of planning for cooking (ingredients, decisions regarding what to cook).

What is interesting to note in each of the three tables is that planning, for the children, is essentially oral. The children have not made references to writing things down. One would expect that there would be some two-dimensional planning occurring in these families, such as writing a menu or a shopping list. However, child involvement in the formulation of lists is likely to be limited, although requests from the child may be added. In some families, lists of things to be done may be drawn up. However, only oral planning (as opposed to written planning) was mentioned in all interviews conducted with the children, except for the following comments which resulted from asking the children about going shopping:

> *I tell mummy what I want to buy. We have to write a shopping list.* (Jessica)
>
> *We write a shopping list, we have to plan what we are going to buy.* (Lauren)
>
> *We write down what we want on a list. But we first look in the cupboard and see if there is nothing.* (Erin)

There are three types of planning that are possible: oral, two-dimensional (2D) (e.g., writing/drawing) and three-dimensional (3D) (e.g., model-making). It can be speculated that the least likely form of planning that children would participate in at home or observe family members

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engage in is three-dimensional planning or model-making. It is possible that, in craft-oriented families, some modelling my occur. However, it is likely that only the adult will engage in this activity and not the child. Once again, this form of planning did not arise in all the data collected. Although the sample size is too small to provide the basis for generalisations, it does provide an indication of the predominance of planning young children are likely to experience.

If young children's experiences prior to school involve mostly oral planning, with minimal two-dimensional planning and very little or no three-dimensional experience, it is little wonder that children do not intuitively engage in 2-D or 3-D planning/design work in school. Most of their planning experiences are oral and, hence, children are more likely to use this mode for planning and designing. A great deal of experience with 2-D (written/drawing) and 3-D modes for planning and designing would be needed by children if they are to engage in anything other than oral planning when in preschool, childcare or school.

Making

Children participate in a range of activities in the home where they make things. How children come to understand the materials and equipment that they use is well understood. Infants have a great deal of experience with oral exploration of materials. As the infant grows older, the other four senses are used more. By the time children attend school, they already understand a great deal about the properties of natural materials such as water, sand, air, rocks, leaves and bark and processed materials such as metal (e.g., pots and pans), plastics (e.g., tupperware containers), glass, paper, cardboard and fabric. Yet, their experiences with regard to adhering or joining materials, cutting materials, combining materials or changing materials to make something new are less well understood. Similarly, their experiences with different types of construction kits such as Lego Duplo will vary depending upon opportunity and adult intervention, interaction or modelling.

The sets of materials children are likely to experience in the home context include:

- Recreational - jigsaws, craft work, and model building.
- Home environment maintenance - garden, house.
- People focused - food, baby care, sewing.

The children in the study were asked a series of questions on things they made with their family or saw family members engage in. Responses to these questions are shown below in Table 4. (Responses by childcare children are grouped together under one heading since questioning/responses were merged - Question Three).

TABLE 4: MAKING

What things do you do or make with mummy?	Childcare	Preschool
		We can't do much because she is always busy (after prompting) Yeah, I do help her make patty cakes. (Regan) Sometimes we sweep up the Wisteria and we water the flowers and strawberries. We look after the pussy cat and hang the washing out. We do drawings, get the firewood and I help mummy with flowers. (Jessica) We make cakes and do the washing. Outside we plant flowers and go for walks. (Erin) I help mum plant, cook the dinner and make pictures and put frames around them. I draw with mummy and go riding. (Elliot) I make cakes and things ... muffins pikelets and pancakes. Outside mum helps me build. (James) We make biscuits and cakes and lots of recipe things. We cook in the kitchen. I usually do some watering with mum. (Lauren)

What things do you do or make with daddy?		We build cubby. (Regan) I collect firewood and help daddy prune the apricot tree. I help him make dinner. (Jessica) We swim and play in the water and we go to the shops. We draw pictures. (Erin) I help daddy split the wood and make a big pile. We make books and we made a bird feeder. (Elliot) We make castles because he (dad) used to make castles out of rock. (James) I go to his work sometimes ... I play on the whiteboard. Daddy uses it when he goes to meetings. (Lauren)

What does your mummy/daddy make or do at home?	They make ice blocks, my mum makes ice-blocks when Mum gets home because I'll be able to have some spaghetti bolognaise. She makes teddy bear jumpers. (Alyse) Some sewing. Mum does sewing. Dad doesn't know how to do them. He knows how to make, to cook fish fingers. He makes lunches. (Claire) (After prompting) *Making a book shelf* Mm ... he got a piece of wood, put some glue onto into them then got another one and stuck it down to the other, and stuck the two ones together stuck, um the middle one to the to the other end where the other ones are, ending and then, the um, moved another one onto the top and the bottom and then, and then, it was and then it was and then he just had to put another layer on top ... and he had to varnish it. (Claire) Um, no they don't. They only sit around and eat tea. (Grace) (Mummy) Makes cakes, play dough, everything like that. (Matthew) (Mummy) Do some jobs. Around the walls she ... painted. Make sandwiches ...cuddles and kisses and, watches videos at the same time. (Sarah)	She does the washing and she sometimes makes porridge. She makes cakes and I help her make them, I put the butter in. (Regan) He works in the nursery and sells plants at the markets. (Regan) She does the shopping. (Jessica) He makes the fire. (Jessica) She makes cakes and food for catering and she makes my bed. (Erin) He cleans the swimming pool. (Erin) She goes out, she goes horse riding. She makes our beds and she looks after me. At work she mows gardens. (Elliot) He goes to work, he drives a truck. Daddy's motor bike is broken, it has a puncture so he can't ride it. He is trying to fix it, he has to take a screw off and put oil in it. (Elliot) I don't know! (long pause) She does the washing up and gardening. At work she looks after sick people. (James) He just works. He sometimes works on his trainer, it has wheels, they move but you can't ride anywhere. (James) She usually cleans the house. She dresses me. She goes to her work and looks after people there. (Lauren) He usually is exhausted from his work and he lies down on the sofa and watches TV. (Lauren)

The children's responses to making things with their parents or observing their parents make things indicated that a great deal of making was occurring in each family. The term *make* was easily understood by the children. The children were easily able to express their understandings and experiences of making. Categories that emerged included: sewing, cooking, painting, lunch preparation, assembling of shelves, house cleaning, shopping, playing, washing, fire wood collecting, and gardening. This finding is not unexpected. Most responses related to the maintenance of the home and family, with children participating in most events.

An analysis of children's making activities in terms of materials, information and systems indicates that two thirds of all responses given related to making with materials (particularly food). The other third of responses indicated that children are involved in, or observe, activities that include systems such as routines and garden watering processes. Comments regarding designing, making and appraising with information technologies such as television, letter writing, radio, computers, books and audio tapes were heard less frequently. These areas were considered by children when asked about their routines. However, when children were asked to comment on making activities, these areas rarely featured. It would seem that information technologies were more associated with passive viewing or receiving and not active designing, making and appraising. For example, the children did not talk about constructing their own audio tapes (for stories, singing, etc.) Once again, this was not an unexpected finding. However, it does highlight the need for curriculum developers and teachers to be aware that the use of information technologies needs to be reconsidered by children - from passive to active use.

Children's understandings and experiences of appraisal of processes and products were also sought during the interviews on *making*. However, the children did not volunteer information regarding this area. Although *appraisal* was regarded as equally important to *making* and *planning* in the study, the appraisal activities were not actively pursued during interviews, as children were not aware at a metacognitive level what 'appraisal' meant. Further exploratory work is needed to develop an interview context that encourages children's understandings of appraisal to be expressed, for example, using photographs of familiar play spaces and asking children to comment on the appropriateness of the play venue.

CONCLUSION

In this study, twelve case examples of children's planning/designing, making and appraising (DMA) experiences in the home were presented. Although a small sample size, this exploratory study has highlighted that children's experiences of DMA are considerable, with most design (planning) occurring orally and only some 2-D activity taking place (such as writing a shopping list).

As would be expected, it was also found that a great deal of *making* activities occur in the home, predominantly focused on people and home maintenance. Most *making* activities related to *materials*, with least in the area of *information*. 'Appraisal' type comments were not forthcoming during interviews. This aspect of the study was inconclusive since it was difficult to ask children questions about the area.

What is interesting to note is the mismatch between curriculum planning emphases in technology education and very young children's home experiences. Given the predominance of *making* and *oral planning* experiences of young children, more attention by curriculum developers needs to be given to helping children engage in 2-D and 3-D planning/designing (and possibly explicit discussion of appraisal). Children's experiences in this area are minimal and, hence, many free-play opportunities (and teaching modelling) of 2-D and 3-D planning/designing is necessary if children are to feel successful in DMA with materials, information and systems.

As with other curriculum areas, it is important to understand, acknowledge and build upon children's experiences. This exploratory study has highlighted the home DMA experiences of

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twelve children, demonstrating the need for teachers to recognise their oral planning experiences and emphasise 2-D and 3-D planning experiences (and possibly appraisal) in their programs. This exploratory study represents the beginning point of finding out about children's home experiences in DMA. Further work into this area is urgently needed.

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APPENDIX

Phase 1: Identification of children's home experiences which may influence their technological activity

Focus questions that were asked of the children included:

Open-ended question to stimulate conversation

1. Show and tell me all the things you do at home ? (I shall walk with the child from room to room as they share this information.)

Making activities

2. What toys or activities do you play with at home? (inside/outside)
3. What things do you do or make with your mummy?
4. What things do you do or make with your daddy?
5. What things do you do or make with your sister/brother?
6. What does your mummy do or make at home?
7. What does your daddy do or make at home?

Planning

8. What do you do when you first come home from preschool?
9. Tell me about how you get ready in the mornings for preschool? How do you decide what to wear?
10. What special things do you do at night time before you go to bed? What things are always the same? How do you decide what will happen?
11. There are special things that you do with your mummy or daddy, such as going shopping. How do you go about planning what you will buy?
12. How do you or your family plan for what you will eat for dinner?
13. When you talk about holidays, how does your family plan what they will do?

Appraisal

This was investigated whilst discussions took place during planning and making.